Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

2T22
p. 2

PACIFIC SOUTHWEST
FOREST AND RANGE
EXPERIMENT STATION
BERKELEY CALIFORNIA

TECHNICAL PAPER NO. 47 - MAY 1960

LIBRARY
SEP 12 1960
U.S. DEPARTMENT OF AGRICULTURE

ARNOLD COURT

U.S.D.A., NAL
AUG 28 2008
CATALOGING PREP

LIGHTNING FIRE INCIDENCE IN NORTHEASTERN CALIFORNIA, 1945 - 1956

FOREST SERVICE - U.S. DEPARTMENT OF AGRICULTURE

LIGHTNING FIRE INCIDENCE
IN NORTHEASTERN CALIFORNIA

By Arnold Court, Meteorologist

Technical Paper No. 47

May 1960

U. S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE
PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION

ABSTRACT

Lightning causes more fires in northeastern California than in all the rest of the State combined. Around Mt. Ingalls in Plumas county, the incidence is about one fire per 10 square miles per year. In northeastern California generally, three-fourths of all lightning-caused forest fires occur in July, August, and September, and two-thirds start between 1 and 6 p.m. These, and other details of lightning-fire incidence on public and private lands were established from tabulation of individual fire reports, as part of a research project supported by the Division of Forestry, California Department of Natural Resources.

CONTENTS

Page

THE PROBLEM 1
Wildfires in California (fig. 1) facing-1

INCIDENCE 2
Incidence map (fig. 2) 3

TIMING. 4
Hour of lightning-fire occurrence (fig. 3). 5

SEASON. 6
Lightning-fire occurrence by months (fig. 4). 7

TREND 8
Annual numbers of lightning-caused fires (fig. 5) 9

LIGHTNING 10
Thunderstorm days in and around N. California (fig. 6) 11

POWER LINES 12

TABLES 1 - 6 13-21

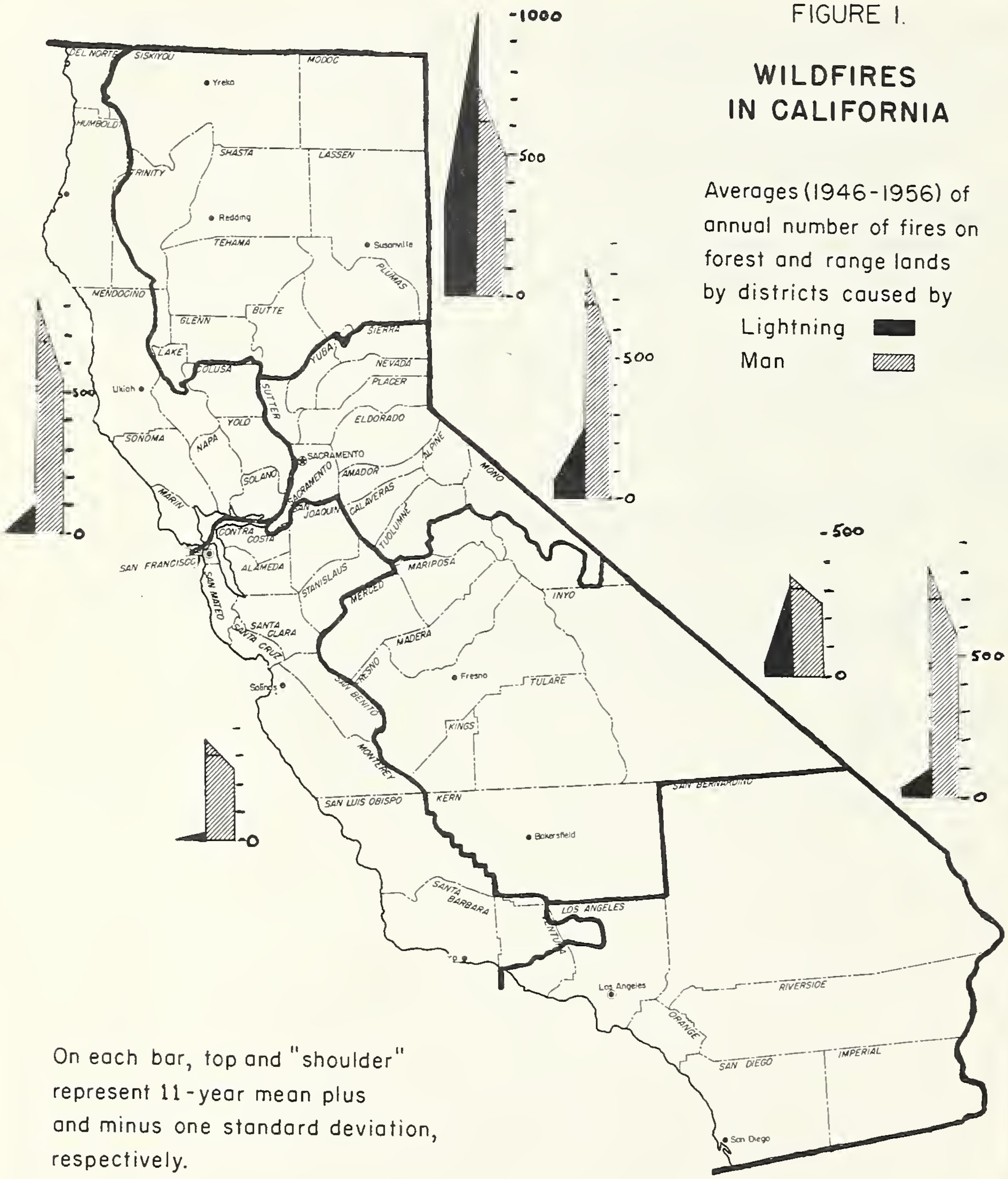

FIGURE I.

WILDFIRES IN CALIFORNIA

Averages (1946-1956) of annual number of fires on forest and range lands by districts caused by

Lightning ■
Man ▨

On each bar, top and "shoulder" represent 11-year mean plus and minus one standard deviation, respectively.

THE PROBLEM

Lightning causes many fires on the wildlands of California. Where are such fires most frequent? In what months, and at what hours are they most likely? These questions arose in the planning and conduct of experiments intended to determine whether cloud seeding, or other weather modification techniques, would reduce the number of fires set by lightning.

Northeastern California experiences more lightning-caused fires than all the rest of the State combined. Figure 1 shows the average number of fires, both lightning-caused and man-caused, during the 11-year period 1946-1956, in each of six districts of California. These districts correspond in general to the administrative districts of the Division of Forestry, California Department of Natural Resources, but the figures came from the Forest Service, the Bureau of Land Management, the National Park Service, and other agencies as well as the Division of Forestry.

On the map, the slant of the top of each bar is proportional to the year-to-year variability in the number of fires. The peak of each bar represents the 11-year mean plus one standard deviation; the "shoulder" corresponds to the mean minus one standard deviation. In about two-thirds of the years the number of fires will be between the "shoulder" and the top of the bar.

These figures show clearly that most of California's lightning fires occur in northern and northeastern California, corresponding to District 2 of the California Division of Forestry. Within this district, most of the fires occur in the northwest (Trinity-Siskiyou) and southeast (Lassen-Plumas) corners. The distribution of such fires in the southeastern portion, and in adjacent areas to the south, and their times of occurrence, are discussed on the following pages.

Actual areas covered by the different discussions vary, because of the availability of basic data and because different questions were being answered. Essentially these questions were of two types: (1) the distribution in time and space of lightning fires in the study area, primarily Lassen and Plumas counties, and (2) possible ways of predicting the occurrence of fires in this area from either (a) occurrence of thunderstorms within the area, as reported by weather observers or inferred from power-line outages caused by lightning strikes, or (b) occurrence of lightning-fires in adjacent forested areas, primarily to the south.

INCIDENCE

Lightning causes fires more often around Mt. Ingalls, in the center of Plumas County and on the Plumas National Forest, than anywhere else in the northern Sierra Nevada and extreme southern Cascade Mountains of California. Incidence of lightning-caused fires around this 8,377-foot peak averaged 169 fires per million acres per year during the 12-year period 1945-1956. (This is about 1 fire per 10 square miles per year.)

Distribution of lightning-fire incidence over some 12,000 square miles of mountain, valley, plain, and desert is mapped in figure 2. Lines have been drawn for each 20 units, a unit being one fire per million acres per year.

To construct the map, individual fire reports (Forest Service form 929, CDF form FC-71 and equivalents) for the 12 years 1945-1956 were tabulated. Reports were obtained from the three National Forests (Lassen, Plumas, Tahoe) in the area, from the California Division of Forestry, from the National Park Service, and from the Bureau of Land Management. Each fire listed as having been caused by lightning was located by township, and totals obtained for each township.

Areas of townships, nominally 23,040 acres, actually vary from less than half this figure to somewhat greater. They were extracted from copies of original land surveys, filed at the Bureau of Land Management in Sacramento. For each township, the intensity was obtained by dividing the 12-year total first by 12, then by the area, and multiplying by a million.

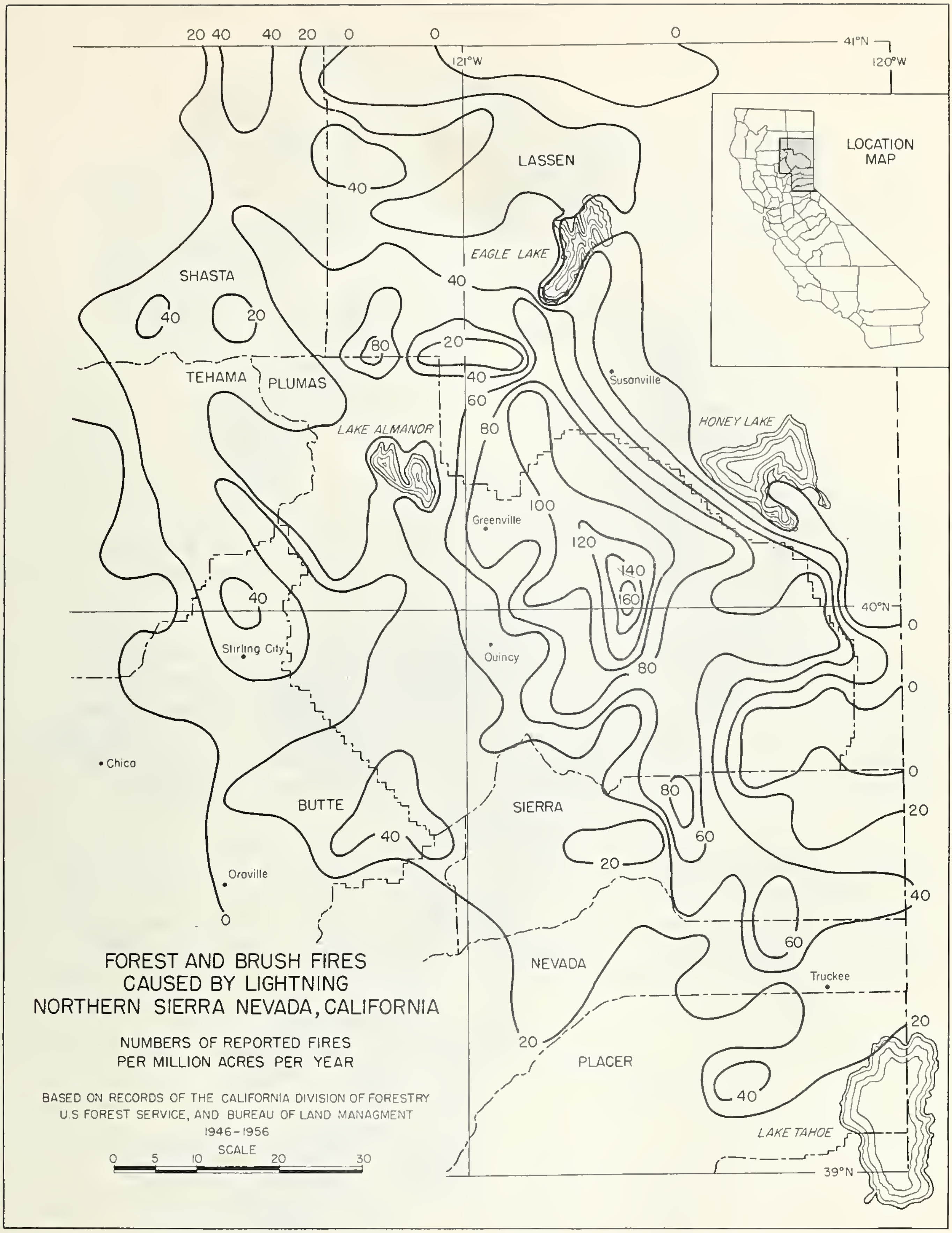

Figure 2.--Map of incidence.

TIMING

In addition to their locations, the hour and month of occurrence were studied for all the 2,940 lightning-caused forest fires reported on the Lassen, Plumas, and Tahoe National Forests in the 12 years 1945 to 1956. These are summarized in tables 1 to 6, which show that:

> Three-fourths of all lightning-caused fires occurred in July, August, and September.
>
> Two-thirds of all lightning-caused fires occurred between 1 and 6 p.m., Pacific Daylight Time.

These concentrations, and other aspects of the time distribution of lightning-caused forest fires, are shown in figures 3 and 4. The total number of lightning-caused fires set during each hour of the day and night is shown in figure 3, separately for each of the three forests.

The diagrams are circular, because the day has no natural beginning or ending. The radial scale is square-root, so that the areas of the individual hour sectors are proportional to the number of fires starting in those hours. Time of start is estimated, rather than known, for most fires, but the estimation considers reports of lightning strokes by lookouts and other observers.

On the Lassen National Forest, heaviest incidence was divided almost equally among the four hours from 2 to 6 p.m. On the other two national forests, lightning caused more fires between 3 and 4 p.m. than during any other hour. On all three forests, lightning-caused fires are rare between midnight and noon. (All times are Pacific Daylight Saving.).

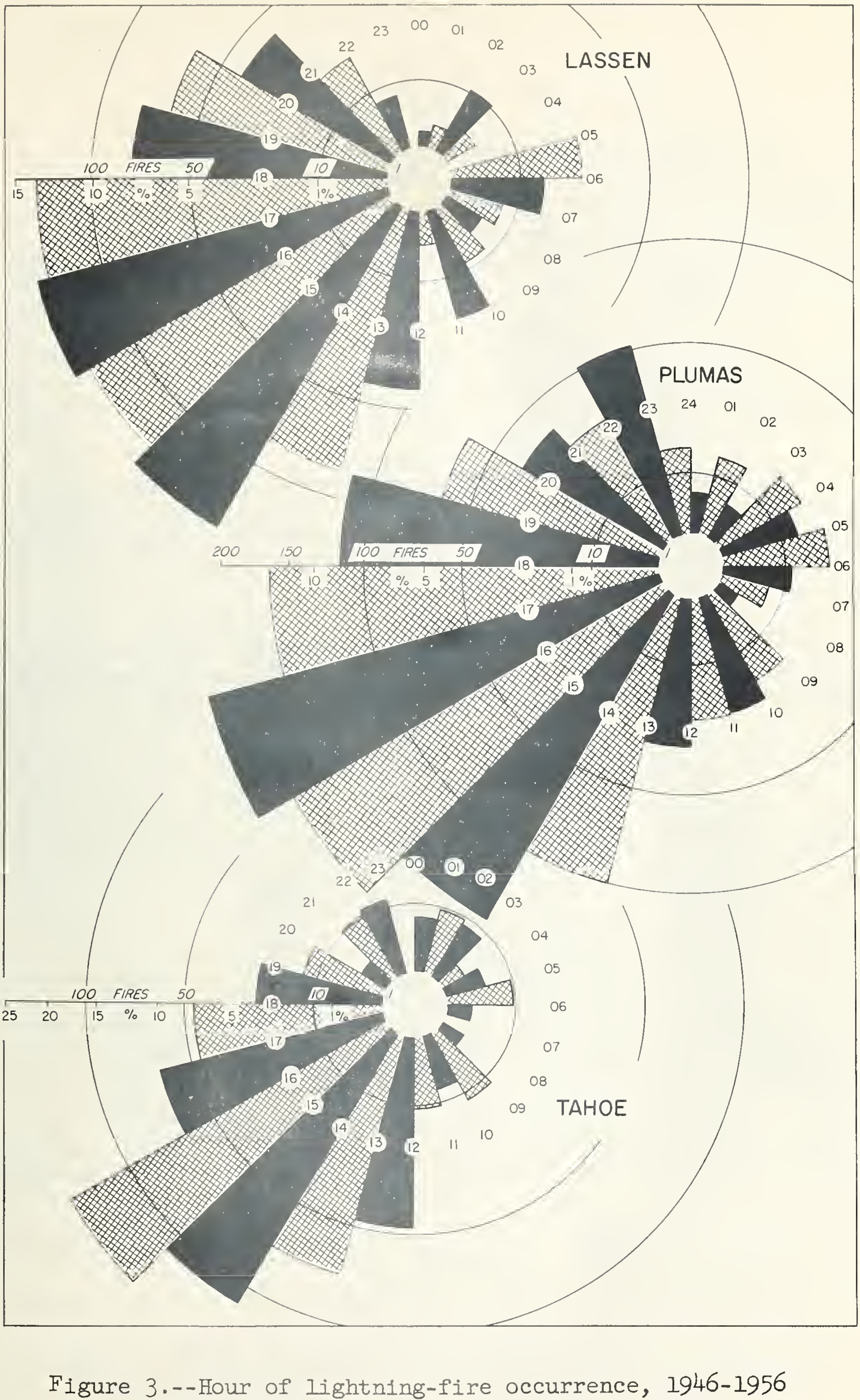

Figure 3.--Hour of lightning-fire occurrence, 1946-1956 on three national forests (all lands).

SEASON

Distribution of reported fires through the season, rather than through the day, is shown in figure 4. In addition, the incidence here has been divided according to protection class: federally-owned land, privately-owned land inside forest boundary, and privately-owned land outside forest boundary but under Forest Service protection.

On the whole, the ratio of the number of fires on private land to that on federal land is about the same from forest to forest, month to month, except that the Tahoe forest has little protected land outside its boundary.

Individual years do not necessarily have the same monthly distribution as the 12-year average. For example, table 5 shows that the number of lightning-caused fires on the Plumas National Forest in July ranged from none at all in 1947, 1948, and 1951 to 106 in 1949, 110 in 1956, and 138 in 1952.

The relation between this distribution of reported fires caused by lightning, and the observed distribution of thunderstorms themselves, is discussed in the section on "Lightning."

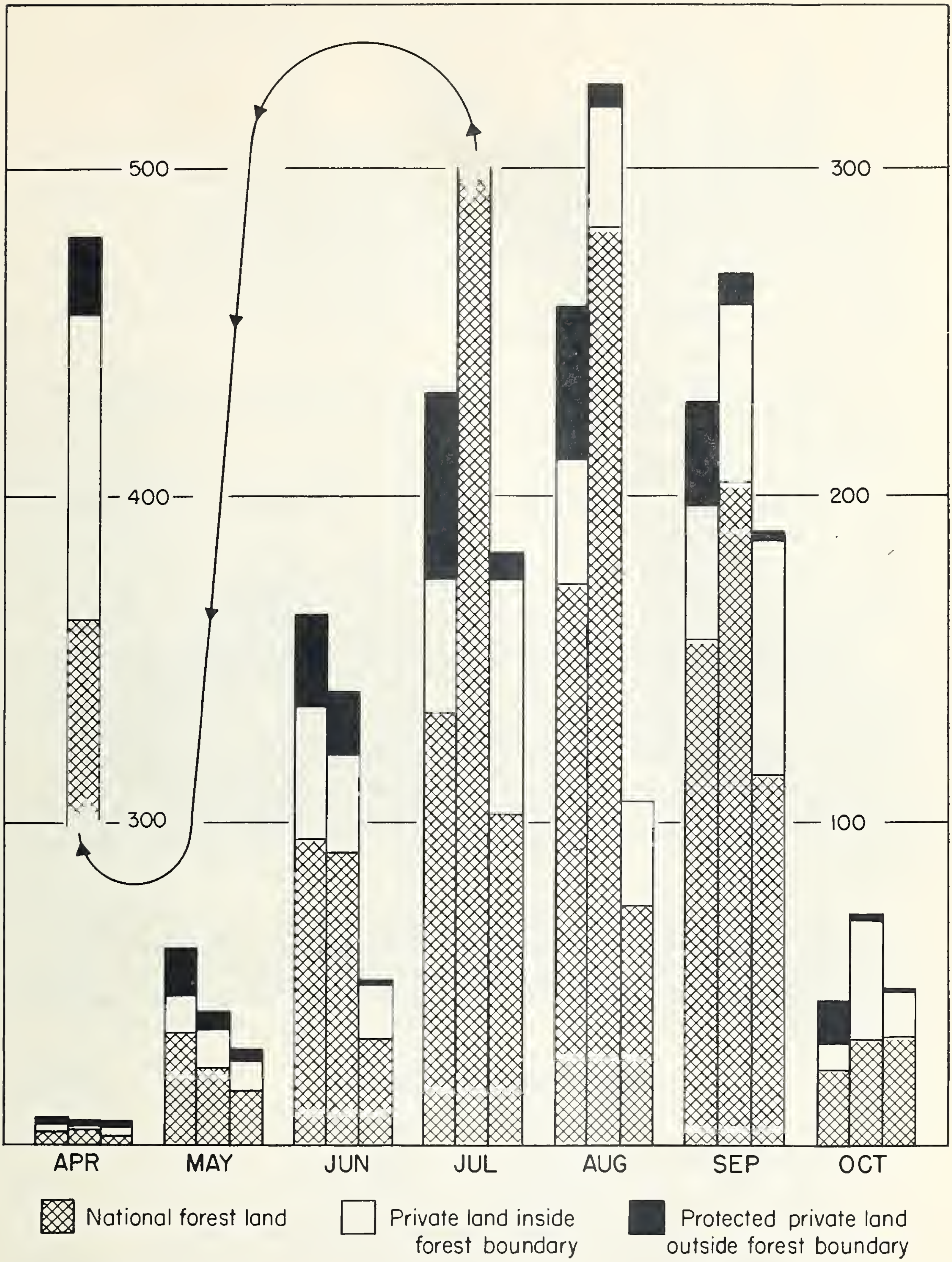

Figure 4.--Lightning-fire occurrence by months, 1946-1956, on Lassen (left), Plumas (center), and Tahoe (right) National Forests.

TREND

The year-to-year variability in the total number of fires on each of these three forests, and two others farther south (Eldorado and Stanislaus) is shown in figure 5. In contrast to the preceding figures and the tables, which used all lightning-caused fires reported by the forest, figure 5 concerns only fires occurring inside the forest boundaries. This restriction was advisable because protection areas changed markedly during the longer period of record, since 1930, used for this diagram.

Total areas inside the boundaries of these five forests, at the start and end of the 27-year period, were (in thousands of acres):

Year	Lassen	Plumas	Tahoe	Eldorado	Stanislaus
1930	1,282	1,465	1,125	844	1,108
1956	1,383	1,413	1,190	886	1,100

The lightning-fire history on each of the five forests (fig. 5) has been fitted with a trend line. Four of the lines have slopes that do not differ significantly from horizontal, indicating no important change in lightning-fire incidence during the 27-years studied. But the trend line for the Plumas National Forest has a decided upward slope, implying that lightning-caused forest fires have increased with time. Such an increase could be due to better reporting, to increased susceptibility to fire from heavier logging, or other reasons.

These five forests, side by side in the northern Sierra Nevada, experience roughly the same weather. Yet the correlations in the annual numbers of lightning-caused fires are not high. Correlation coefficients of the numbers of fires, per year, inside the boundaries of the five forests are:

	Stanislaus	Eldorado	Tahoe	Plumas
Lassen	.50	.62	.78	.78
Plumas	.42	.48	.69	
Tahoe	.61	.75		
Eldorado	.81			

As expected, correlations are highest (0.7 to 0.8) for adjacent forests, and decrease with increasing distance between forests.

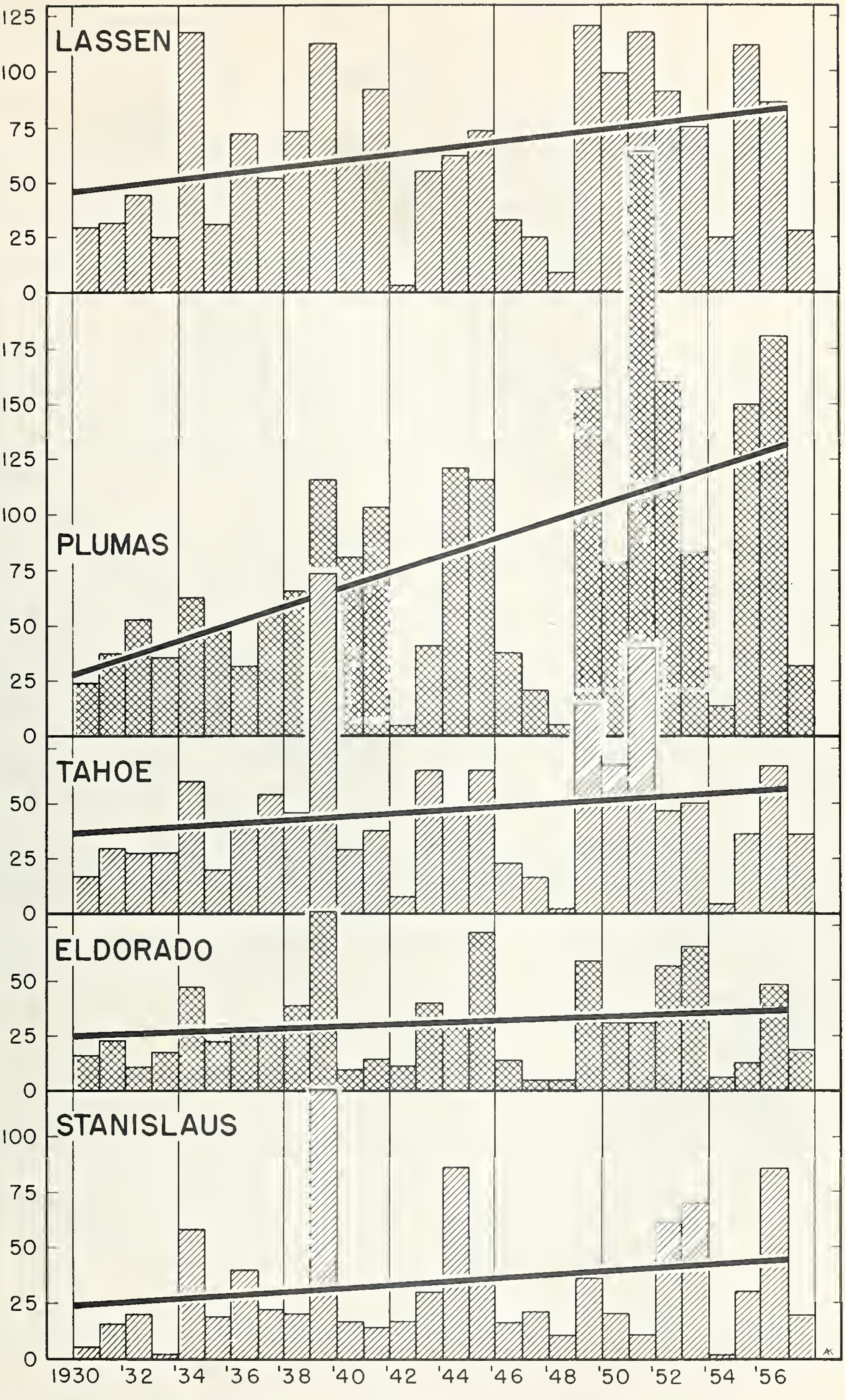

Figure 5.--Annual number of lightning-caused forest fires inside boundaries of national forests.

LIGHTNING

Although lightning-caused fires are most frequent in July, August, and September in northeastern California, thunderstorms themselves are less frequent in those months than earlier and later in the year. The only reliable record of thunderstorm frequency in the area covered by figure 2 is that for the Weather Bureau station at Blue Canyon, indicated near the bottom of the map.

Weather stations count days on which thunder is heard, rather than the total number of thunderstorms. For comparison, the number of days on which fires were set by lightning on the Tahoe National Forest are listed along with the number of thunderstorm days at the weather station, which is on the western margin of the forest:

1945-1956	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lightning-fire days	0	0	0	8	13	26	32	22	26	18	0	0
Thunderstorm days	2	6	5	17	28	24	15	8	19	16	3	0

As shown clearly by this comparison, weather station reports of thunderstorm activity are not a reliable index of the number of fires caused by lightning on nearby forest and brush lands. Hence the seasonal distribution of thunderstorm days, shown in figure 6, cannot be used to infer the distribution of lightning-caused fires.

Figure 6, taken from a paper on "Thunderstorm Frequency in Northern California" (Bulletin of the American Meteorological Society, in press), shows for each of five Weather Bureau stations in northern California, two in Oregon, and one in Nevada, the average number of days with thunderstorm in each month; the radial scale is square-root, so that the areas of the sectors, rather than their lengths, are proportional to the numbers of thunderstorm days.

Also shown are the correlations between the numbers of thunderstorm days at various pairs of stations, both for the July-September fire season ("S") and for the calendar year ("Y"). The correlations are indicated by the points of the black triangles. Since these correlations are based on relatively short periods, they will change as more years are added; the base of each triangle indicates the range within which the correlation is likely to vary.

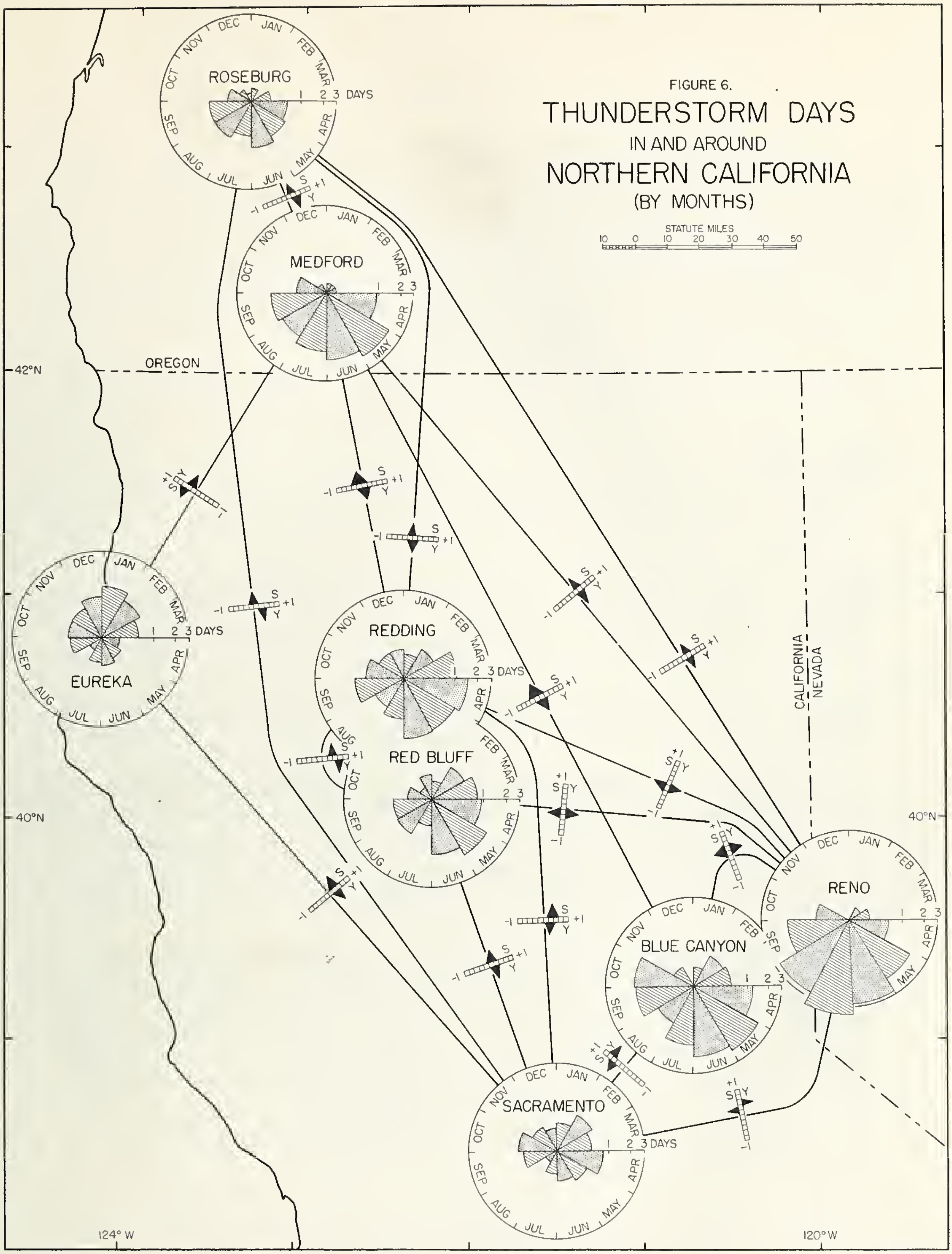

FIGURE 6.

THUNDERSTORM DAYS IN AND AROUND NORTHERN CALIFORNIA (BY MONTHS)

POWER LINES

Lightning often strikes electric transmission lines. Outages due to lightning are logged by most utility companies. From the records of the California-Pacific Utilities Company and the Pacific Gas and Electric Company, the numbers of such outages in the years 1951-1956 were compiled for three sets of transmission lines, corresponding roughly to the three national forests. For each forest and the power lines running through it, the numbers of lightning-caused fires and of outages, by months, were:

1951-1956	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Tot
Lassen (incl. Lassen Park)													
Fires	0	0	0	1	17	108	160	176	128	22	0	0	612
Outages	0	0	0	0	7	6	1	7	3	1	0	0	25
Plumas													
Fires	0	0	0	3	13	98	296	227	195	10	0	0	832
Outages	2	2	3	7	15	7	0	3	6	5	0	0	50
Tahoe													
Fires	0	0	0	4	8	28	107	68	107	15	0	0	337
Outages	7	0	0	1	24	4	4	1	2	4	0	0	47

Both along the Feather River (in the Plumas forest) and along the Yuba River and Highway 40 (in the Tahoe forest) power lines suffer most from lightning in May, but the peak is not very pronounced. Farther north, the power lines through the Lassen Forest appear to experience about the same number of outages throughout the summer.

Although only five years of data are available, and the total number of outages is much smaller than the number of lightning-caused forest fires, the differences in the seasonal distribution of the two effects of lightning are quite evident. Forests are vulnerable to lightning only when they are dry, in the latter part of summer, while powerlines can be disrupted throughout the year by lightning. Powerline outages cannot be used to estimate the number of fires caused by lightning in the forest and brush areas they traverse.

Table 1.--Hour of occurrence of 1,000 lightning-caused fires, Lassen National Forest, 1945-1956, by years and by months

(Figures are numbers of fires starting during hour ending at time shown. Times are as entered on F. S. Form 929, and are Pacific War Time for 1945, Pacific Daylight Time from last Sunday in April to last Sunday in September, 1946-1956, and otherwise Pacific Standard Time.)

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1945	.	1	2	.	.	.	.	.	.	3	.	.	6	9	10	15	14	13	14	11	8	1	.	.	107
1946	.	.	.	.	.	.	.	.	.	.	2	1	4	11	5	5	2	1	3	1	1	.	2	.	38
1947	.	.	.	.	.	.	6	1	1	3	.	1	1	5	6	1	1	5	.	1	.	.	.	.	32
1948	.	1	1	.	.	.	.	.	.	.	2	.	.	.	.	2	2	1	.	.	.	1	.	.	10
1949	.	.	.	3	1	25	7	2	.	2	8	1	9	9	12	9	24	12	2	3	3	.	2	.	134
1950	.	.	1	.	.	.	.	.	.	.	.	.	.	13	28	18	16	13	17	4	.	1	1	.	112
1951	.	.	.	.	.	.	1	1	.	.	.	1	15	13	45	18	19	9	.	.	2	1	.	.	125
1952	.	.	2	.	.	.	1	2	3	.	6	.	.	3	11	27	17	10	4	8	7	1	.	.	102
1953	.	.	2	.	.	.	.	.	1	.	.	.	2	6	12	12	10	27	6	2	1	.	.	.	81
1954	1	.	.	.	.	.	.	.	.	.	.	.	.	.	4	7	3	5	2	.	.	3	.	.	25
1955	1	.	.	.	.	.	.	.	.	.	.	.	.	3	8	10	9	35	16	24	5	8	1	1	121
1956	.	1	2	1	.	.	.	1	.	.	1	.	4	13	7	11	29	7	13	7	13	2	1	.	113
Total	2	3	10	4	1	25	15	7	5	8	19	4	41	85	148	135	146	138	77	61	40	18	7	1	1000
Apr.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	1	1	.	1	2	.	.	.	.	9
May	1	1	.	.	.	.	.	1	.	1	1	1	1	6	11	9	6	11	3	2	2	.	4	.	61
Jun.	.	.	3	.	.	.	.	1	.	.	7	.	.	5	18	18	16	24	24	25	12	8	1	1	163
Jul.	.	1	1	.	.	.	.	.	.	.	1	1	8	21	30	41	58	40	8	15	7	2	.	.	234
Aug.	1	.	2	.	.	.	6	1	.	3	.	1	22	23	47	35	35	30	29	6	11	4	2	.	258
Sep.	.	.	4	4	1	25	8	3	1	1	9	1	10	20	37	28	22	31	10	7	4	3	.	.	229
Oct.	.	1	.	.	.	.	1	1	4	3	1	.	.	6	5	3	8	2	2	4	4	1	.	.	46

Table 2.--Hour of occurrence of 1,324 lightning-caused fires, Plumas National Forest, 1945-1957, by years and by months

(Figures are numbers of fires starting during hour ending at time shown. Times are as entered on F. S. Form 929, and are Pacific War Time for 1945, Pacific Daylight Time from last Sunday in April to last Sunday in September, 1946-1957, and otherwise Pacific Standard Time.)

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1945	.	.	.	.	.	10	8	3	.	.	2	.	.	11	9	17	16	25	16	9	.	.	.	.	126
1946	.	.	.	1	.	.	.	.	.	.	.	.	3	4	6	14	7	1	.	2	1	.	1	1	41
1947	.	.	.	.	.	.	.	.	.	.	.	1	1	3	5	3	7	4	.	.	.	.	.	.	24
1948	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.	.	.	.	.	5
1949	.	1	1	11	12	8	.	.	.	1	1	4	5	20	35	28	19	7	15	.	3	3	.	.	174
1950	.	2	1	.	.	.	.	.	1	3	.	1	.	4	3	16	28	7	12	2	.	.	2	.	82
1951	.	8	2	2	.	.	1	.	1	2	.	4	7	26	40	44	51	21	14	1	4	12	22	6	268
1952	1	1	.	.	.	.	.	1	.	1	7	4	4	8	17	14	22	35	18	6	14	3	5	3	164
1953	1	.	.	.	.	.	.	.	.	3	3	2	2	3	10	14	24	8	4	8	1	.	.	2	85
1954	.	.	.	.	.	.	.	.	.	.	2	1	1	.	.	4	2	1	.	3	.	.	.	.	14
1955	3	.	1	1	.	.	1	1	.	.	.	.	2	7	14	20	29	27	4	12	9	8	15	1	155
1956	.	.	.	.	.	.	.	1	1	6	6	5	5	15	17	23	23	26	32	19	3	1	3	.	186
1957	1	.	.	.	.	.	2	.	.	.	.	.	.	3	3	5	3	7	1	5	4	2	.	.	36
*Total	5	12	5	15	12	18	10	6	3	16	21	22	30	101	156	197	232	163	115	62	35	27	48	13	1324
(Apr	.	.	.	.	.	.	.	.	.	.	.	.	1	.	5	2	.	.	.	.	.	.	.	.	8
(May	.	.	.	.	.	.	.	.	.	.	2	.	1	1	6	9	14	2	3	1	1	1	.	.	41
(Jun	1	1	1	1	.	.	1	1	.	.	3	4	3	9	6	16	20	6	10	14	9	7	15	1	129
*(Jul	1	2	1	1	1	10	8	4	1	5	8	4	7	46	71	76	80	60	43	18	14	7	7	4	479
(Aug	3	1	1	.	.	.	.	.	1	7	1	7	8	30	41	58	60	44	32	19	7	2	3	2	327
(Sep	.	8	2	13	11	8	1	.	1	3	1	7	8	13	23	25	50	41	6	6	3	10	22	6	268
(Oct	.	.	.	.	.	.	.	1	.	1	6	.	2	2	4	11	8	10	21	4	1	.	1	.	72

* 1945-1956 (Not including 1957).

Table 3.--Hour of occurrence of 616 lightning-caused fires, Tahoe National Forest, 1945-1957, by years and by months

(Figures are numbers of fires starting during hour ending at time shown. Times are as entered on F. S. Form 929, and are Pacific War Time for 1945, Pacific Daylight Time from last Sunday in April to last Sunday in September, 1945-1957, and otherwise Pacific Standard Time.)

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1945	1	.	.	1	3	1	3	.	.	.	.	1	8	5	6	9	10	6	6	3	.	1	5	.	69
1946	.	1	.	.	.	.	.	.	.	.	2	.	11	1	3	3	1	.	.	.	.	1	.	.	23
1947	.	.	.	.	.	.	.	.	.	1	.	1	7	2	2	3	.	.	.	.	.	1	.	.	17
1948	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	2
1949	.	.	6	1	.	8	.	.	1	9	2	2	1	17	26	19	4	2	2	.	.	.	.	.	100
1950	.	.	.	.	1	.	.	.	.	.	.	1	3	5	17	19	10	6	1	.	1	4	.	.	68
1951	5	7	1	1	.	.	.	.	.	.	3	5	7	21	25	27	9	6	.	3	.	.	2	.	122
1952	.	.	.	.	1	.	.	.	1	1	.	.	5	6	8	9	7	7	1	4	.	.	.	.	50
1953	.	.	.	.	.	.	.	.	.	.	.	.	1	9	2	17	10	8	5	.	.	.	.	.	52
1954	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	2	.	.	5
1955	.	1	1	.	.	.	.	.	1	.	.	.	1	.	2	10	5	5	7	2	.	2	4	.	41
1956	.	.	.	.	.	.	.	.	.	.	.	.	2	7	21	27	6	4	.	.	.	.	.	.	67
1957	.	.	2	.	.	.	.	.	.	.	.	.	1	.	2	7	7	10	2	.	.	5	1	.	37
*Total	7	9	8	3	5	9	3	.	3	11	7	10	46	73	112	144	63	45	23	12	2	10	11	.	616
(Apr	1	.	.	.	1	.	.	.	.	.	.	.	.	.	1	2	3	.	.	.	1	.	.	.	9
(May	.	1	1	.	.	.	.	.	1	.	.	1	1	4	9	5	2	3	2	.	.	.	.	.	30
(Jun	.	.	.	.	.	.	.	.	.	.	1	2	3	3	4	19	8	2	1	.	.	3	5	.	51
*(Jul	.	.	.	1	.	1	3	.	.	1	2	.	12	27	51	49	10	12	7	6	.	.	.	.	182
(Aug	1	.	.	.	3	.	.	.	.	1	1	6	18	19	22	13	8	12	2	.	.	.	.	.	106
(Sep	5	7	7	2	1	8	.	.	1	9	3	1	4	17	20	47	22	14	7	3	1	7	3	.	189
(Oct	.	1	.	.	.	.	.	.	1	.	.	.	8	3	5	9	10	2	4	3	.	.	3	.	49

* 1945-1956 (Not including 1957).

Table 4.--Hour of occurrence of 1,000 lightning-caused fires, Lassen National Forest, by months, 1945-1956

(Figures are numbers of fires starting during hour ending at time indicated. Times are entered on F. S. Form 929, and are Pacific War Time for 1945, Pacific Daylight Time from last Sunday in April to last Sunday in September, 1946-1956, otherwise Pacific Standard Time.)

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1945																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	5	.	1	1	1	.	.	.	.	9
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	3	2	6	6	4	.	.	.	24
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	4	5	3	.	.	.	.	.	.	16
Aug	.	.	.	.	.	.	.	.	.	.	.	.	5	4	2	5	4	6	6	1	1	.	.	.	36
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Oct	.	1	.	.	.	.	.	.	.	3	.	.	.	3	4	.	2	1	1	3	3	1	.	.	22
1946																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	2
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jul	.	.	.	.	.	.	.	.	.	.	.	1	4	11	4	5	2	1	2	.	.	.	.	.	30
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	2	.	.	.	1	.	.	.	.	.	.	.	.	.	3
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	3
1947																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	1	.	.	.	1	.	.	.	.	5
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	4
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	6	1	.	3	.	1	.	2	1	.	1	5	.	.	.	.	.	.	20
Sep	.	.	.	.	.	.	.	.	1	.	.	.	1	.	1	.	.	.	.	.	.	.	.	.	3
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1948																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	2	1	.	.	.	1	.	.	7
Jul	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1949																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	.	.	.	.	3
May	.	.	.	.	.	.	.	.	.	1	1	.	.	2	.	1	6	10	.	1	2	.	2	.	26
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	2
Jul	.	.	.	.	.	.	.	.	.	.	.	.	2	.	5	7	17	2	.	.	1	.	.	.	34
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Sep	.	.	.	3	1	25	7	2	.	1	7	1	7	6	6	.	.	.	1	1	.	.	.	.	68
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1950																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	3
Jun	.	.	1	.	.	.	.	.	.	.	.	.	.	2	4	7	4	3	5	.	.	.	.	.	26
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	1	2	.	1	.	.	.	.	7
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	5	5	4	12	3	.	1	1	.	34
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	9	17	6	6	4	.	.	.	.	.	.	42
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0

Table 4.--Continued

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1951																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1
May	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2	.	.	.	.	.	.	.	.	.	3
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	2	2	1	.	.	1	.	.	.	11
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	.	.	.	.	.	.	15	10	34	15	17	8	.	.	1	1	.	.	101
Sep	.	.	.	.	.	.	1	1	.	.	.	.	.	1	4	1	.	.	.	.	.	.	.	.	8
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
1952																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	1	.	.	5	.	.	.	.	3	.	2	.	.	.	.	.	.	11
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	2	10	16	14	8	3	7	4	1	.	.	65
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	2
Sep	.	.	2	.	.	.	.	.	.	.	.	.	.	1	.	6	3	.	1	1	3	.	.	.	17
Oct	.	.	.	.	.	.	1	1	3	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	7
1953																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Jun	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	7	.	1	.	.	.	.	9
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	4	5	2	.	4	2	.	.	.	.	.	17
Sep	.	.	.	.	.	.	.	.	.	.	.	.	2	2	7	8	10	16	4	1	1	.	.	.	51
Oct	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
1954																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.	3
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	1	.	.	.	.	.	.	.	.	.	.	.	.	.	3	4	1	.	.	.	.	.	.	.	9
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	5	2	.	.	3	.	.	13
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1955																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	1	5	14	12	18	5	7	1	1	71
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	15	2	2	.	1	.	.	22
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	6	1	6	2	4	.	.	.	.	21
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	1	3	.	.	.	.	.	.	.	6
1956																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	1	.	.	.	.	.	1	.	.	.	.	.	4	2	2	.	.	2	.	.	.	.	.	12
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	1	2	.	.	.	6
Jul	.	.	.	.	.	.	.	.	.	.	1	.	2	7	5	6	19	2	1	4	2	.	.	.	49
Aug	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	1	7	3	9	2	9	2	1	.	37
Sep	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	3	1	.	.	.	.	.	.	6

Table 5.--Hours of occurrence of 1,324 lightning-caused fires, Plumas National Forest, by months, 1945-1957

(Figures are numbers of fires starting during hour ending at time indicated. Times are as entered on F. S. Form 929, and are Pacific War Time for 1945, Pacific Daylight Time from last Sunday in April to last Sunday in September, 1946-1957, otherwise Pacific Standard Time.)

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1945																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	2	.	.	.	1	4	3	1	1	1	.	.	.	.	13
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	1	2	4	2	.	.	.	.	11
Jul	.	.	.	.	.	10	8	3	.	.	.	.	.	9	3	4	2	1	.	.	.	.	.	.	40
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	3	5	12	7	4	.	.	.	.	36
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	5	9	4	2	.	.	.	.	26
1946																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	2
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jul	.	.	.	1	.	.	.	.	.	.	.	.	1	3	6	12	7	1	.	.	.	.	.	1	32
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Oct	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	2	1	.	1	.	6
1947																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	1	.	3	1	.	.	.	.	.	.	.	.	5
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	.	.	.	.	.	1	.	3	2	2	2	1	.	.	.	.	.	.	11
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	3	.	.	.	.	.	.	8
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1948																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	3
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	2
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1949																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	1	.	.	1	.	.	.	10
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	2
Jul	.	1	1	.	1	.	.	.	.	.	.	.	.	19	30	21	10	3	15	.	2	3	.	.	106
Aug	.	.	.	.	.	.	.	.	.	.	.	2	1	5	1	.	2	.	.	.	.	.	.	.	11
Sep	.	.	.	11	11	8	.	.	.	1	1	4	3	.	.	4	1	1	.	.	.	.	.	.	45
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1950																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	7	2	.	4	1	.	.	.	.	16
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	1	.	.	.	.	.	5
Aug	.	1	1	.	.	.	.	.	.	2	.	.	.	1	.	7	17	3	7	1	.	.	2	.	42
Sep	.	.	.	.	.	.	.	.	1	1	.	1	.	2	2	1	8	3	.	.	.	.	.	.	19
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0

Table 5.--Continued

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1951																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	2
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	3
Jun	.	.	.	.	.	.	.	.	.	.	.	.	2	2	1	1	4	.	.	.	.	.	.	.	10
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	.	.	1	1	.	3	4	21	28	37	33	15	11	.	2	2	.	.	158
Sep	.	8	2	2	.	.	1	.	.	1	.	1	1	3	9	4	13	6	3	1	2	10	22	6	95
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1952																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	3	1	1	2	.	2	.	.	.	.	.	.	.	9
Jul	1	1	.	.	.	.	.	.	.	.	2	1	2	5	15	13	19	35	16	6	11	3	5	3	138
Aug	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	1	1	.	2	.	2	.	.	.	8
Sep	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	1	.	.	.	3
Oct	.	.	.	.	.	.	.	1	.	1	4	.	.	.	.	.	.	.	.	.	.	.	.	.	6
1953																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1
Jun	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Jul	.	.	.	.	.	.	.	.	.	.	2	.	.	.	2	1	15	3	1	.	.	.	.	.	24
Aug	1	.	.	.	.	.	.	.	.	3	.	1	1	.	1	5	.	.	.	7	1	.	.	2	22
Sep	.	.	.	.	.	.	.	.	.	.	.	1	1	3	7	8	9	5	2	1	.	.	.	.	37
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1954																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	2	.	.	.	.	.	.	.	.	5
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	1	.	.	.	.	.	.	4
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	3	.	.	.	.	4
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1955																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	.	.	3
Jun	1	.	1	1	.	.	1	1	.	.	.	.	.	3	3	5	9	3	2	11	9	6	15	1	72
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	7	6	1	1	.	.	1	.	.	20
Aug	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	3
Sep	.	.	.	.	.	.	.	.	.	.	.	.	1	4	5	7	14	23	1	1	.	.	.	.	56
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
1956																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.	1	.	.	.	.	.	6
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1
Jul	.	.	.	.	.	.	.	1	1	5	4	3	4	10	10	16	18	14	9	12	1	.	2	.	110
Aug	.	.	.	.	.	.	.	.	.	1	.	2	.	3	.	2	2	11	5	7	2	.	1	.	36
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Oct	.	.	.	.	.	.	.	.	.	.	2	.	1	2	3	4	3	1	17	.	.	.	.	.	33
1957																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	2
May	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	.	.	1	4	2	.	.	11
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	2	1	5	.	2	.	.	.	.	14
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	1	.	.	.	.	.	2	.	.	.	.	.	.	.	.	1	1	2	1	.	.	.	.	.	8
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0

Table 6.--Hour of occurrence of 616 lightning-caused fires, Tahoe National Forest, by months, 1945-1957

(Figures are numbers of fires starting during hour ending at time indicated. Times are as entered on F. S. Form 929, and are Pacific War Time for 1945, Pacific Daylight Time from last Sunday in April to last Sunday in September, 1946-1957, otherwise Pacific Standard Time.)

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1945																									
Apr	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2
May	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	1	2	1	2	.	.	.	.	.	9
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.	.	.	1	1	.	6
Jul	.	.	.	1	.	1	3	.	.	.	.	.	.	1	4	1	.	1	.	.	.	.	.	.	12
Aug	1	.	.	.	2	.	.	.	.	.	.	1	3	1	.	1	.	2	.	.	.	.	.	.	11
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1
Oct	.	.	.	.	.	.	.	.	.	.	.	.	5	1	1	2	7	2	4	3	.	.	3	.	28
1946																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	3
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jul	.	.	.	.	.	.	.	.	.	.	2	.	8	.	1	.	.	.	.	.	.	.	.	.	11
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	1	.	.	3
Oct	.	1	.	.	.	.	.	.	.	.	.	.	1	.	1	3	.	.	.	.	.	.	.	.	6
1947																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	1	.	.	.	3
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	.	.	.	1	.	1	7	2	.	.	.	.	.	.	.	.	.	.	11
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	2
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1948																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	2
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1949																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	1	.	1	4	2	.	2	.	.	.	.	.	.	10
Jun	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	3	2	.	.	.	.	.	.	.	8
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	15	19	13	.	.	2	.	.	.	.	.	49
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	1	.	.	.	.	.	.	.	4
Sep	.	.	6	1	.	8	.	.	1	9	2	1	.	.	.	.	1	.	.	.	.	.	.	.	29
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1950																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	.	.	1	.	.	.	.	.	6
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1	.	.	.	.	.	.	3
Aug	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	3	3	3	.	.	.	.	.	.	12
Sep	.	.	.	.	1	.	.	.	.	.	.	.	1	5	15	11	7	2	.	.	1	4	.	.	47
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0

Table 6.--Continued

Hour:	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Tot
1951																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	2
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Jun	.	.	.	.	.	.	.	.	.	.	1	2	.	2	1	2	2	1	.	.	.	.	.	.	11
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	.	.	.	.	1	3	6	13	20	3	3	1	.	.	.	.	.	.	50
Sep	5	7	1	1	.	.	.	.	.	.	1	.	1	6	4	21	2	4	.	3	.	.	2	.	58
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1952																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1
Jul	.	.	.	.	.	.	.	.	.	1	.	.	4	5	8	9	7	6	1	4	.	.	.	.	45
Aug	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	3
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Oct	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
1953																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.	.	.	.	.	.	3
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	3
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	3	1	5	2	.	.	.	.	.	12
Sep	.	.	.	.	.	.	.	.	.	.	.	.	1	6	.	11	9	3	3	.	.	.	.	.	33
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1954																									
Apr	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	2
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2	.	.	3
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
1955																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	1	1	.	.	.	.	.	1	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	5
Jun	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	3	3	.	.	.	.	2	4	.	13
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	4	2	.	.	.	.	8
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	2	5	3	.	.	.	.	.	13
Oct	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	2
1956																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	5	17	22	3	4	.	.	.	.	.	.	51
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	.	.	.	3
Sep	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Oct	.	.	.	.	.	.	.	.	.	.	.	.	2	2	2	3	3	.	.	.	.	.	.	.	12
1957																									
Apr	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	2
May	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	3	.	.	.	.	.	.	7
Jun	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Jul	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	4	4	6	.	.	.	.	.	.	16
Aug	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Sep	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	2	.	1	.	.	.	.	.	.	4
Oct	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	1	.	8

* NATIONAL AGRICULTURAL LIBRARY
1022501025